Western Europe: The Outlook for Natural Gas Demand

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The sharp runup in natural gas prices in the past two years, coupled with sluggish economic growth, has caused an unprecedented drop in natural gas consumption in West European countries during the past 18 months. The ability of exporters to link future gas price movements more closely to changes in oil prices and the surprising decline in gas use have caused most observers to reevaluate the role of natural gas in future energy needs. The most recent forecasts by major oil companies and individual West European members of the International Energy Agency (IEA) now point to substantially lower natural gas requirements for Western Europe in 1990 than forecast just two or three years earlier. In most cases, the decline in projected gas consumption represents 40 percent or more of the proposed volume of the single-line Soviet gas pipeline.

The six countries involved in negotiations for additional Soviet gas expect their requirements to increase by about 550,000 b/d oil equivalent by 1990, mostly for use in residential space heating. Based on anticipated levels of domestic production and firm contracts for gas imports, West Germany, the Netherlands, and Italy will need little if any additional Soviet imports to meet their own projected levels of gas demand. Only France, Belgium, and Austria face a significant shortfall without additional Soviet gas under their present demand projections. In any case, as recent gas price increases begin to affect consumption and the soft oil market continues, the projected need for additional gas to meet consumption requirements and to substitute for oil will likely decline even further. The prospects of reduced demand and increased supplies from other sources, especially Algeria, will give the West Europeans considerable leverage in their negotiations with the Soviets on gas prices.

Western Europe: Natural Gas Consumption *Million b/d Oil Equivalent*

	1973	1979	1980 [a]
Total	2.4	3.7	3.5
Industry	1.1	1.4	1.3
Residential/commercial	0.9	1.6	1.6
Energy sector including electricity generation	0.4	0.7	0.6

[a] Estimated.

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Recent Trends in Gas Use

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Consumption of natural gas in Western Europe increased about 50 percent between 1973 and 1979, rising from about 2.4 million b/d oil equivalent to about 3.7 million b/d oil equivalent. Growth in domestic production, principally in the North Sea and the Netherlands, accounted for about three-fourths of the increase in available supplies with the remainder coming from imports outside the region.

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The rapid growth in consumption is mainly attributable to the extremely low price of gas relative to competing oil products. In 1973, for example, delivered prices for Dutch gas—the largest source of European supplies—were only two-thirds of the equivalent crude oil price. Although prices for gas traded in the West European market more than tripled between 1973 and mid-1979, they still remained at about two-thirds of crude oil parity on a heat equivalent basis and were only about one-third of the price of home heating oil. The

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Western Europe: Energy Prices

US $/Million BTU

	Natural Gas [a]	Crude Oil [b]	Residual Fuel [c] (3.5 percent sulfur)	Heating Oil [c]
1973	0.44	0.68	0.73	1.91
1974	0.69	1.94	1.66	2.21
1975	1.07	1.90	1.47	2.29
1976	1.18	2.02	1.59	2.44
1977	1.54	2.22	1.80	2.71
1978	1.83	2.23	1.79	2.95
1979	2.14	3.22	3.17	7.10
1980	3.22	4.06	4.04	7.04
1981	3.32 (Jan)	5.88 (Jul)	3.99 (Jul)	6.59 (Jul)

[a] Average delivered price of Dutch gas to French border.
[b] Weighted average of OPEC official sales price.
[c] Average price f.o.b. Rotterdam.

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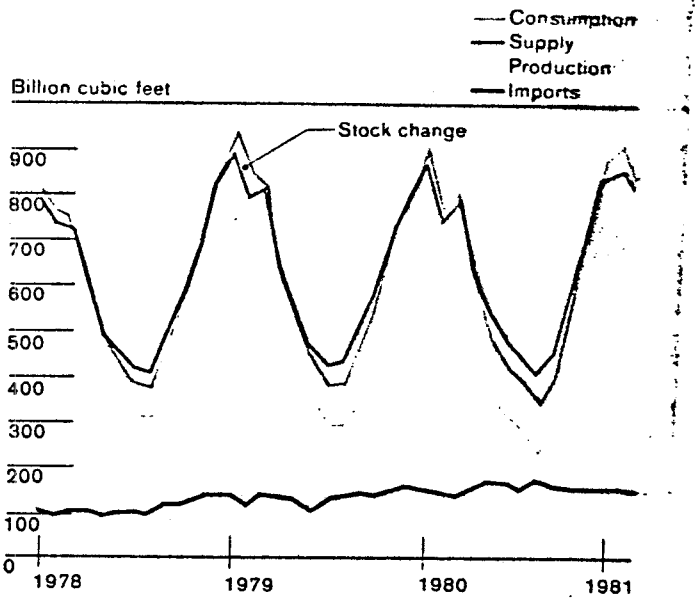
European Seasonal Natural Gas Trends[a]



[a] Data for EC countries only.

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tremely favorable price relationship encouraged gas consumption and substitution for oil, enabling producers and distributors to secure the necessary long-term sales commitments needed to justify investments in pipelines and distribution networks. Moreover, it presented an optimistic outlook for continued growth in gas consumption with a compelling need to line up additional imports to meet this growth and offset the expected decline in domestic supplies [redacted]

Recent data on West European gas use indicate that total consumption fell for the first time ever in 1980, declining by 4 percent. Preliminary data show that gas consumption continued to slide in first-half 1981 in West Germany and the United Kingdom, down 6 percent and 1 percent respectively. French gas use, however, increased by almost 5 percent, in part reflecting greater availability of supplies to the industrial sector as a result of the resumption of full contract volumes of Algerian liquefied natural gas (LNG) [redacted] 25X1

The unprecedented decline in gas consumption in Western Europe resulted mainly from sluggish economic performance and sharply higher gas prices. Most of the decline occurred in the industrial and electricity generating sectors, while performance in the residential sector was mixed. In West Germany, for example, industrial use fell 3 percent and consumption by power plants declined 10 percent, while residential use rose 7 percent as a result of additional gas hookups. Residential gas use in the Dutch market, however, fell 7 percent because of milder weather and higher prices. Gas already accounts for more than 60 percent of space heating requirements in Dutch homes. Consumption by Dutch industry and power stations was off 4 percent and 28 percent, respectively, in 1980. [redacted] 25X1 25X1

Western Europe: Natural Gas Demand Forecasts for 1990

Company	Forecast Date	Gas Demand *(Million b/d Oil Equivalent)*
Chevron	1979	6.2
	1981	5.4
Shell [a]	1978	5.2
	1981	4.2-4.8
Texaco	1978	5.1
	1981	4.8
IEA	1977	5.3
	1980	5.1

[a] Shell's 1981 forecast posits two alternative price scenarios. The lower demand estimate assumes gas prices exceed residual fuel oil prices, eliminating virtually all gas use in nonpremium applications.

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West Europe: Energy Demand [a]

Million b/d Oil Equivalent

	1979 Actual	1977 [b]		1980 [c]	
		1985	1990	1985	1990
Total energy	24.8	30.5	35.2	28.3	31.9
Natural gas	3.7	4.8	5.3	5.1	5.1
Production	3.2	3.4	2.8	3.9	3.0
Net imports	0.5	1.4	2.5	1.2	2.1

[a] IEA European countries plus France, and excluding Portugal.
[b] From 1977 IEA Review.
[c] From 1980 IEA Review.

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A third factor, a shortfall in gas deliveries, had only a marginal impact on gas consumption in Western Europe. West European gas consumption is very seasonal, peaking as high as 30 billion cubic feet per day during the winter months and declining to as low as 13 billion cubic feet a day in the summer. Differences are smoothed out by varying domestic production and adjusting small levels of gas stocks; European import volumes remain relatively constant. During peak winter needs in both 1980 and 1981, some import shortfalls occurred from the USSR, Algeria, and Libya, necessitating a switch to alternative fuels, thus slightly reducing gas consumption

Demand Projections

Natural gas prices have continued to escalate sharply over the past two years with delivered prices for Dutch gas rising more than 75 percent between mid-1979 and mid-1980. Until last October, the escalation of Dutch gas prices was linked to 80 percent of the change in residual fuel oil prices with a lag of 10 months or more. The Hague, however, successfully renegotiated the pricing formula with its customers last year. The new formula will raise the base price of gas to near parity with low-sulfur fuel oil prices by 1983 and provides an indexation rate of 95 percent with only a five-month lag. The higher prices for Dutch gas have been matched by the Soviets

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Algeria and Libya have actively sought sharply higher prices for their gas exports. The Algerians have successfully negotiated higher prices for small volumes with UK and Spanish customers, resulting in delivered gas prices equal to crude prices on a heat equivalent basis. More importantly, Algerian

Selected European Countries: Sectoral Energy Usage[a]

Million b,d Oil Equivalent

Energy Use by Sector	Total		West Germany		France		Italy		Netherlands		Belgium		Austria	
	1979	1990	1979	1990	1979	1990	1979	1990	1979	1990	1979	1990	1979	1990
Industrial	4.23	5.38	1.28	1.48	1.21	1.58	0.90	1.16	0.41	0.54	0.30	0.44	0.13	0.18
Oil	1.72	1.09	0.37	0.24	0.68	0.12	0.41	0.34	0.14	0.20	0.08	0.14	0.04	0.05
Solid fuels	0.66	1.12	0.24	0.34	0.18	0.38	0.10	0.16	0.04	0.09	0.07	0.11	0.03	0.04
Gas	1.14	1.60	0.39	0.38	0.19	0.44	0.23	0.39	0.19	0.20	0.10	0.13	0.04	0.06
Electricity	0.69	1.40	0.26	0.36	0.16	0.64	0.16	0.26	0.04	0.05	0.05	0.06	0.02	0.03
Other [b]	0.02	0.17	0.02	0.16			0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Residential and Commercial	4.39	5.33	1.69	1.62	1.10	1.81	0.66	0.84	0.49	0.52	0.29	0.33	0.16	0.21
Oil	2.32	1.51	0.98	0.70	0.65	0.19	0.38	0.30	0.09	0.07	0.15	0.14	0.08	0.11
Solid fuels	0.38	0.23	0.12	0.06	0.19	0.10	0.01	0.03	0.00	0.00	0.03	0.02	0.03	0.02
Gas	0.98	1.53	0.28	0.38	0.08	0.36	0.17	0.27	0.35	0.38	0.08	0.11	0.02	0.03
Electricity	0.64	1.92	0.25	0.38	0.18	1.16	0.10	0.21	0.05	0.06	0.03	0.06	0.03	0.05
Other [b]	0.06	0.14	0.06	0.10			0.00	0.03	0.00	0.01	0.00	0.00	0.00	0.00
Electricity generation	4.29	6.75	1.67	2.40	1.18	1.98	0.78	1.45	0.26	0.32	0.22	0.34	0.18	0.26
Oil	0.99	0.83	0.11	0.08	0.25	0.08	0.44	0.48	0.10	0.12	0.07	0.05	0.02	0.02
Solid fuels	1.14	2.04	0.96	1.22	0.03	0.14	0.07	0.48	0.01	0.08	0.06	0.08	0.01	0.04
Gas	0.95	0.51	0.33	0.26	0.38	0.02	0.05	0.06	0.13	0.10	0.04	0.05	0.02	0.02
Nuclear	0.43	2.56	0.19	0.72	0.16	1.46	0.01	0.20	0.02	0.02	0.05	0.16	0.00	0.00
Hydro	0.78	0.81	0.08	0.12	0.36	0.28	0.21	0.23	0.00	0.00	0.00	0.00	0.13	0.18

[a] IEA, 1980 Review except France: France OECD Energy Balance 1979 and Energy Plan A for 1990.
[b] Includes renewable energy sources.

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negotiators succeeded in extracting an indexing formula from the Belgians that allows gas prices to rise in step with prices for a basket of high-quality crudes.

The sharp rise in natural gas and other energy prices and the success exporters have had in linking future gas prices more closely to movements in oil prices have significantly altered the outlook for both total energy and gas demand. Recent industry forecasts project total energy use in 1990 about 10 to 15 percent below levels predicted two or three years ago. Most forecasts for natural gas demand in 1990 have also been revised downward in the past year. Since 1978, Texaco, Shell, and Chevron have lowered their projections for West European demand by 6 percent, 8 percent, and 13 percent, respectively. Under Shell's assumption that gas prices will rise more rapidly to a level above residual fuel oil prices, gas requirements fall 20 percent below Shell's earlier forecast, largely because gas is no longer competitive in low-value applications such as electricity generation

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In 1980 the IEA projected 1990 total energy demand in Western Europe 9 percent lower than a 1977 forecast, with gas demand projected to be 4 percent lower. These projections are based on member- country submissions and include estimates

Western Europe: Natural Gas Supply and Demand Balances, 1990

Thousand b/d Oil Equivalent

	West Germany	France	Italy	Netherlands	Belgium	Austria
Total gas consumption	1,020	820	720	680	290	110
Gas supplies	995	515	720	680	110	65
Domestic production	300	120	210	610	0	20
Algeria	0	170	215	0	45	0
Libya	0	0	40	0	0	0
Netherlands	270	75	110		0	0
Nigeria	40	30	25	15	20	0
Norway	180	50	0	55	45	0
USSR	205	70	120	0	0	45
Potential shortfall	**25**	**305**	**0**	**0**	**180**	**45**
Possible additional supplies	330	400	225	145	140	45
Algeria	140	120+	120	75	45	0
Cameroon	0	120	0	0	0	0
Nigeria	40	30	25	15	20	0
USSR	150	130	80	55	75	45
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from the French energy plan. While gas consumption in 1990 is expected to be lower than previously forecast, total gas use still is expected to be about 1.4 million b/d oil equivalent higher than actual 1979 consumption

Energy use in the six countries involved in negotiations with the USSR for additional gas—West Germany, France, Italy, the Netherlands, Belgium, and Austria—is expected to increase by about 4.5 million b/d oil equivalent by 1990. Gas use in these countries is forecast to grow by about 550,000 b/d oil equivalent by 1990. More than 90 percent of the increase is expected to occur in the residential/commercial sector. Growth in gas consumption in this sector will account for nearly 60 percent of the overall increase in residential energy use. The expected growth in industrial gas use will be largely offset by a decline in gas consumption for electricity generation. The six countries still plan to use slightly more than 500,000 b/d oil equivalent of natural gas for electricity generation in 1990.

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The key to achieving these levels of gas consumption rests with the magnitude of future gas price increases and the relationship between gas prices and other forms of energy, especially oil. While gas is likely to maintain some price advantage relative to crude oil because of limits on substitutability, the

advantage is unlikely to increase because of the indexation to oil price clauses negotiated in recent gas contracts.

The increase in gas prices between 1979 and 1981 has already dampened consumer enthusiasm for switching from oil to gas, especially in low-value applications in the industrial sector. Delivered prices for most gas now approximate prices for residual fuel oil, and remain substantially higher than the cost of imported coal. Thus, gas probably will be replaced at an even faster pace than now projected in the utility sector

The potential for increasing oil-to-gas conversions in the residential sector has also been curtailed by gas price escalation. In 1979 the difference between delivered prices for natural gas and home heating oil in West Germany was substantial enough to allow a homeowner to invest $2,000 in converting to a gas furnace and realize enough savings to pay back the initial investment cost in three years. At 1981 prices and assuming a 30-percent efficiency gain with a new $2,500 gas furnace, the homeowner would not recover the conversion cost for six years.

The long leadtimes involved in securing gas from export projects and the high capital investment needed for distribution infrastructure make it imperative that gas utilities accurately gauge the future demand for natural gas. The recent slump in gas demand has forced several utilities to reevaluate their estimates of gas demand. West Germany's Ruhrgas, in particular, is reportedly undertaking a more thorough analysis of market prospects. Too rapid a price increase before gas supplies come on line will eliminate prospective markets for gas, leaving the utilities with excess volumes of gas and underutilized capacity in the distribution network

The Need for Soviet Gas

The proposed single-line Soviet gas pipeline would deliver an additional 500,000 b/d oil equivalent of natural gas annually to six West European countries beginning in the mid-1980s. Without Soviet supplies, only France, Belgium, and Austria are likely to experience a serious shortfall in the availability of natural gas even if the present official estimates of consumption are realized. Adequate supplies of gas, however, are likely to be available from Algeria, Nigeria, Cameroon, and possibly other sources to meet projected increases in demand and offset declines in domestic production. The presence of several alternative gas suppliers, prospects for continued softness in energy markets, and the need to guarantee a viable market for new supplies should allow prospective West European buyers to take a firm price negotiating stance.

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West Germany's 1980 submission to the IEA projects total natural gas use of 1.02 million b/d oil equivalent in 1990. This contrasts with the Ruhrgas estimate of 1.2-1.3 million b/d oil equivalent. Domestic production is expected to supply 300,000 b/d oil equivalent while deliveries under presently operating and signed contracts from the Netherlands, Norway, Nigeria, and the USSR will provide 695,000 b/d oil equivalent

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The small shortfall implied from the above estimates easily can be procured from Algeria, which could have an exportable surplus of about 500,000 b/d oil equivalent in the late 1980s. Bonn has also been seeking additional supplies of liquefied natural gas (LNG) from Nigeria, Qatar, and Cameroon. The West Germans almost certainly will not need additional Soviet gas of as much as the 150,000 b/d oil equivalent they have been seeking in negotiations with the USSR.

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France's energy plan projects natural gas demand in 1990 at 820,000 b/d oil equivalent. Firm import commitments from the Netherlands, Algeria, Norway, Nigeria and the USSR total 395,000 b/d oil equivalent, while domestic production, as forecast by several oil companies, adds another 120,000 b/d oil equivalent.

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Unless France is able to secure a sizable chunk of potential Algerian supplies and the full volume of the proposed Cameroon LNG project, it will require additional Soviet gas to meet projected demand. The French are already attempting to patch up differences with the Algerians over pricing issues. In any event, Paris probably will not need the full 130,000 b/d oil equivalent of additional Soviet gas that Gaz de France has been authorized to procure.

Italy's submission to the IEA forecasts gas demand of about 720,000 b/d oil equivalent in 1990. The Italians have signed contracts or are already receiving deliveries on about 510,000 b/d oil equivalent of gas supplies. Estimated domestic production of some 210,000 b/d oil equivalent would enable Italy to meet projected gas demand with no need for additional Soviet gas. The Italians are well situated to secure any needed gas supplies from Algeria once present pricing difficulties are overcome

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The Netherlands projects natural gas consumption at about 680,000 b/d oil equivalent in 1990. Domestic production potential is more than sufficient to meet Dutch needs for the next 20 years, including present export contracts, without importing Soviet gas. The Dutch are committed to importing a total of 70,000 b/d oil equivalent of Norwegian and Nigerian gas and have been seeking gas from Algeria to extend domestic supplies. Recent declines in domestic consumption and export sales, coupled with success in gas exploration offshore, may cause The Hague to relax its stance on conservation and hence reduce the need for additional imports.

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Belgium's IEA submission projects gas demand at 290,000 b/d oil equivalent in 1990. Firm import commitments total only 110,000 b/d oil equivalent. Algeria and Nigeria could supply an additional 65,000 b/d oil equivalent of gas supplies, but unless Dutch deliveries can be extended or other supplies procured, the Belgians will need Soviet gas by 1990 to meet projected demand

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Austria's natural gas consumption is expected to total 110,000 b/d oil equivalent in 1990. With domestic production expected to decline to 20,000 b/d oil equivalent and firm import commitments from the Soviet Union currently totaling 45,000 b/d oil equivalent, Vienna will need more Soviet gas to meet its needs. Indeed, the Soviets are the only realistic source for additional Austrian imports at present.

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